

Upper Pliocene Progradational Play

UP P1, #0961

Buliminella 1

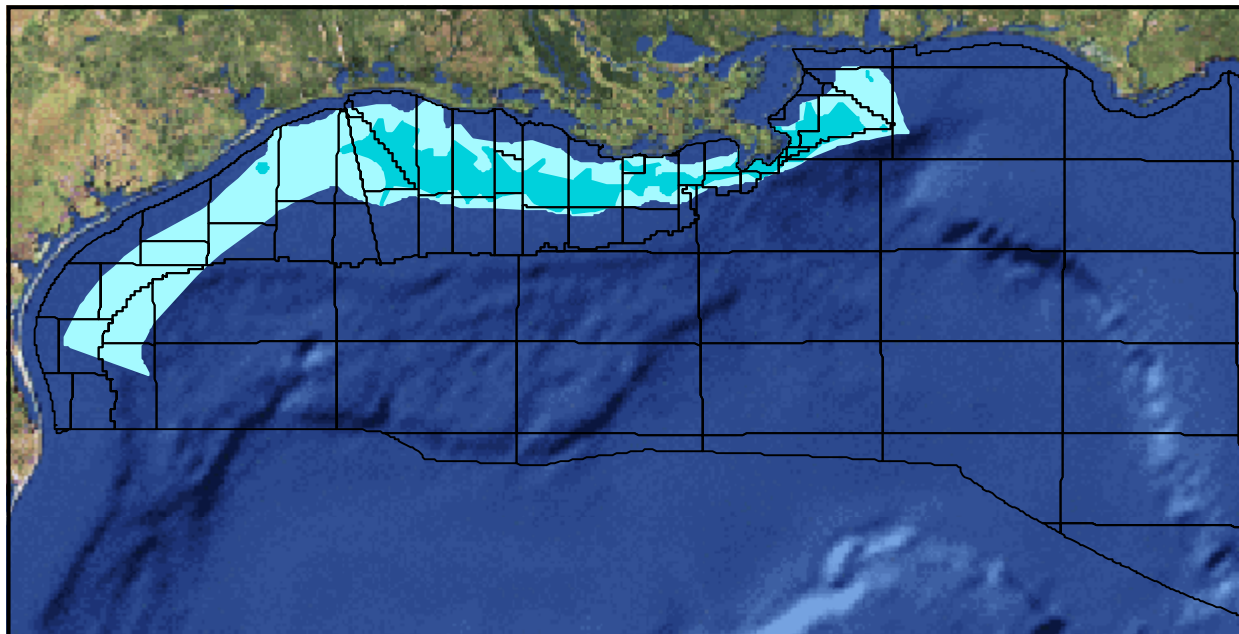


Figure 172. UP P1 map showing location of play. Play limit shown in light cyan; hydrocarbon limit shown in dark cyan.

Overview

The Upper Pliocene Progradational Play (UP P1) contains the fifth largest amount of reserves of any GOM play ([Figure 2](#)), with 8,984.619 Bcfg and 1,000.094 MMbo (2,598.781 MMBOE) in 722 sands in 144 fields. Comparing all 65 GOM plays, UP P1 ranks fourth in oil reserves (7%). The play extends continuously from the North Padre Island and Port Isabel to Destin Dome Area ([Figure 172](#)).

Description

UP P1 is defined by (1) a progradational depositional style representing major regressive episodes in which sediments outbuild onto the shelf and slope and (2) the UP Chronozone, the top of which is defined by the *Buliminella 1* biozone ([Figure 8](#)).

UP P1 extends continuously from the North Padre Island and Port Isabel Area offshore Texas to the west-central Destin Dome Area east of the modern Mississippi River Delta ([Figure 172](#)). Hydrocarbons have been encountered in much of that same

area except most all offshore Texas because of an apparent lack of shelf source sands during UP time.

The ancestral Mississippi River Delta System dominated deposition of the play's sediments. The depocenter present in the offshore Texas area no longer received significant amounts of sand-rich sediments during UP time (Morton et al., 1985).

The areas occupied by the older Lower Pliocene Progradational Play (LP P1) and UP P1 are very similar, with UP P1 showing a noticeable basinward shift in the High Island through South Timbalier Area.

Play Limits

UP P1 deposits grade into the sediments of the Upper Pliocene Aggradational Play (UP A1) in an updip direction. An apparent lack of shelfal source sands limits UP P1 in updip and southwest directions in the Texas offshore. UP P1 also extends onshore in some areas. At its farthest northeast extent, the play pinches out. UP P1 deposits grade into the sediments of the Upper Pliocene Fan 1 (UP

F1) and Upper Pliocene Fan 2 (UP F2) Plays in a downdip direction.

Depositional Style

UP P1 is characterized by sediments deposited predominantly on the UP shelf, with less common, generally finer grained sediments deposited on the UP upper slope. These sediments represent major regressive episodes in which outbuilding of both the shelf and the slope occur. Additionally, retrogradational, reworked sands with a thinning and back-stepping log signature locally cap the play. Because these retrogradational sands are poorly developed, discontinuous, and not correlatable for any significant distance, they are included as part of UP P1.

The UP progradational interval varies from approximately 50 to more than 6,300 ft in thickness, with net sand thicknesses as much as approximately 1,300 ft. Individual sand-dominated successions in the play range from tens of feet to several hundreds of feet in thickness, separated by relatively thinner shale intervals. Progradational depositional facies, predominantly comprising delta fringe sands, channel/levee complexes, and distributary mouth bars, characterize UP P1. These facies exhibit upward-coarsening (delta fringe and distributary mouth bar) and blocky to upward-fining (channel/levee) log signatures. The thickest sand-dominated intervals probably represent stacked facies of multiple episodes of delta-lobe switching and progradation. The play less commonly contains crevasse splay deposits, shelf blanket sands, and delta slump deposits that are characterized by isolated, prominent, and subdued spiky log patterns.

Structural Style

Well over one-third of the fields in this play are structurally associated with salt diapirs—shallow, intermediate, and deep depths—with hydrocarbons trapped on diapir flanks or in sediments draped over diapir tops. Other fields are structurally associated with normal faults, anticlines, and growth fault anticlines. Some fields also contain hydrocarbon accumulations trapped by permeability barriers and updip pinchouts or facies changes.

Quantitative Attributes

On the basis of reserves calculations, UP P1 contains 62% gas and 38% oil. The 722 sands in the play comprise 2,074 reservoirs, of which 1,022

| | No. of Sands | Oil (MMbbl) | Gas (Bcf) | BOE (MMbbl) |
|------------------|--------------|-------------|-----------|-------------|
| Proved | 720 | 999.928 | 8,979.272 | 2,597.663 |
| Cum. production | 698 | 868.083 | 7,864.315 | 2,267.427 |
| Remaining proved | 395 | 131.845 | 1,114.957 | 330.236 |
| Unproved | 2 | 0.166 | 5.347 | 1.118 |

Table 79. UP P1 reserves and cumulative production.

are nonassociated gas, 877 are undersaturated oil, and 175 are saturated oil. Proved reserves are estimated at 8,979.272 Bcfg and 999.928 MMbo (2,597.663 MMBOE) in 720 sands in 143 fields (Table 79). Unproved reserves are estimated at 5.347 Bcfg and 0.166 MMbo (1.118 MMBOE) in 2 sands in 1 field. These proved plus unproved reserves account for over 50% of the reserves for the UP Chronozone.

Of all 65 GOM plays, UP P1 ranks fourth in oil production (8%). Cumulative production from UP P1 totals 7,864.315 Bcfg and 868.083 MMbo (2,267.427 MMBOE) from 698 sands from 141 fields. UP P1 production accounts for 59% of the UP Chronozone's total production. Remaining proved reserves in the play are 1,114.957 Bcfg and 131.845 MMbo (330.236 MMBOE) in 395 sands in 113 fields.

Table 80 summarizes that water depths of the fields in UP P1 range from 22–856 ft, and play interval discovery depths vary from 1,115–16,200 ft, subsea. Additionally, porosity and water saturation range from 16–39% and 16–63%, respectively.

| 722 Sands | Min | Mean | Max |
|---------------------|-------|-------|--------|
| Water depth (ft) | 22 | 135 | 856 |
| Subsea depth (ft) | 1,115 | 9,143 | 16,200 |
| Reservoirs per sand | 1 | 3 | 61 |
| Porosity | 16% | 29% | 39% |
| Water saturation | 16% | 29% | 63% |

Table 80. UP P1 sand attributes. Values are volume-weighted averages of individual reservoir attributes.

Exploration History

UP P1 has a 45-year history of discoveries (Figure 173). The first sands in the play were discovered in 1954 in the South Timbalier 52 and West Cameron 192 Fields. The maximum number of sands discovered in any year occurred in 1966 with 40 sands from 14 fields. However, the maximum yearly reserves of 276.476 MMBOE were added in 1963 with the discovery of 37 sands from 10 fields.

Sand discoveries per year appear bimodal with peaks in the late-1960's and mid-1980's.

The largest sand in the play was discovered in 1964 in the Vermilion 245 Field and contains an estimated 60.257 MMBOE (Figure 174). The mean sand size for the play is 3.599 MMBOE. Since the first Atlas database cutoff of January 1, 1995, 43 sands have been discovered, the largest of which is estimated to contain 4.603 MMBOE.

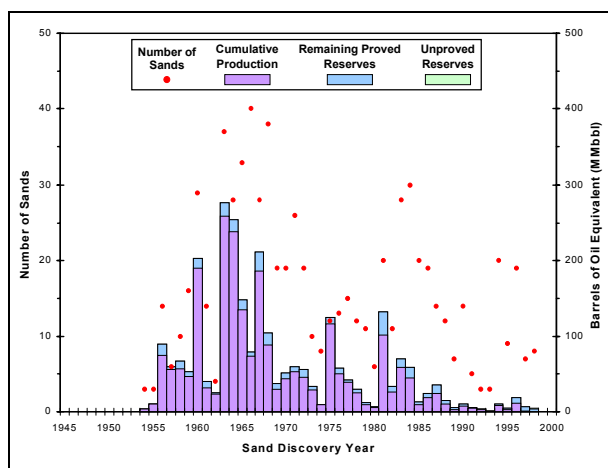


Figure 173. UP P1 exploration history graph showing reserves and number of sands discovered by year.

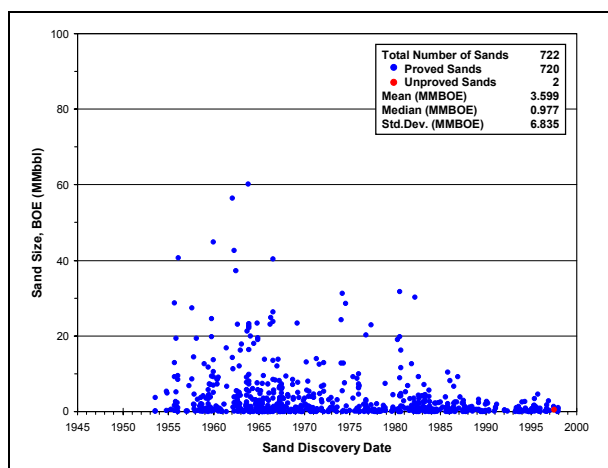


Figure 174. UP P1 sand discovery graph showing the size of sands discovered by year.

Production History

UP P1 has a 43-year history of production (Figure 175). Oil and gas production began in 1956 and generally increased during the 1950's and 1960's. Oil production peaked in 1973, and has since fluctuated below but near that peak value. Gas production generally leveled off in the early 1970's, reaching its highest yearly value in 1989. Subsequently, gas production declined below that peak value until 1996, when it began to increase again.

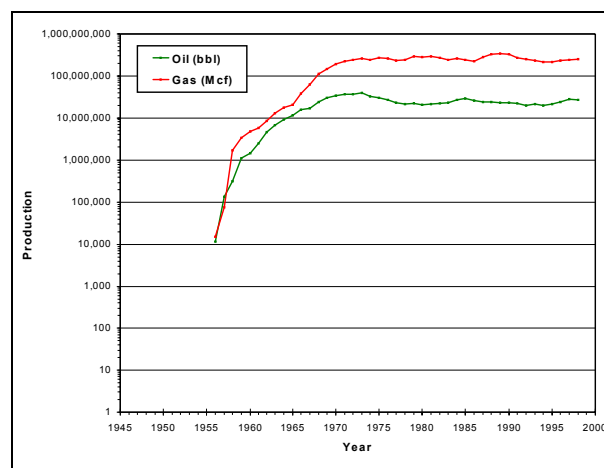


Figure 175. UP P1 production graph showing oil and gas production by year.